

1)

- a. Find the equation of the line that passes through (2,4) and (4, 10).
 b. Find a line that is parallel to the line in #a that passes through (1, 5).
 c. Find a line that is perpendicular to #a that passes through (0, -3)

$$m = \frac{10-4}{4-2} = \frac{6}{2} = 3$$

$$y = 3x + b$$

$$4 = 3(2) + b$$

$$4 = 6 + b$$

$$-6 -6$$

$$-2 = b$$

$$\textcircled{a} \quad y = 3x - 2$$

$$\textcircled{b} \quad y = 3x + b$$

$$5 = 3(1) + b \quad b = 2$$

$$y = 3x + 2$$

$$\textcircled{c} \quad y = -\frac{1}{3}x - 3$$

2) Let $f(x) = 3x^4$. Write a new function g (in terms of x) when f is shifted:

- a. Up 4
 b. To the right 2
 c. To the left 3
 d. Down 7

$$\begin{aligned} \text{a) } f(x) &= 3x^4 + 4 \\ \text{b) } f(x) &= 3(x-2)^4 \\ \text{c) } f(x) &= 3(x+3)^4 \\ \text{d) } f(x) &= 3x^4 - 7 \end{aligned}$$

3) For $f(x) = x^4 - 2x^2 + 1$, determine:

a. any local extrema

b. any absolute extrema

$$x^4 - 2x^2 + 1$$

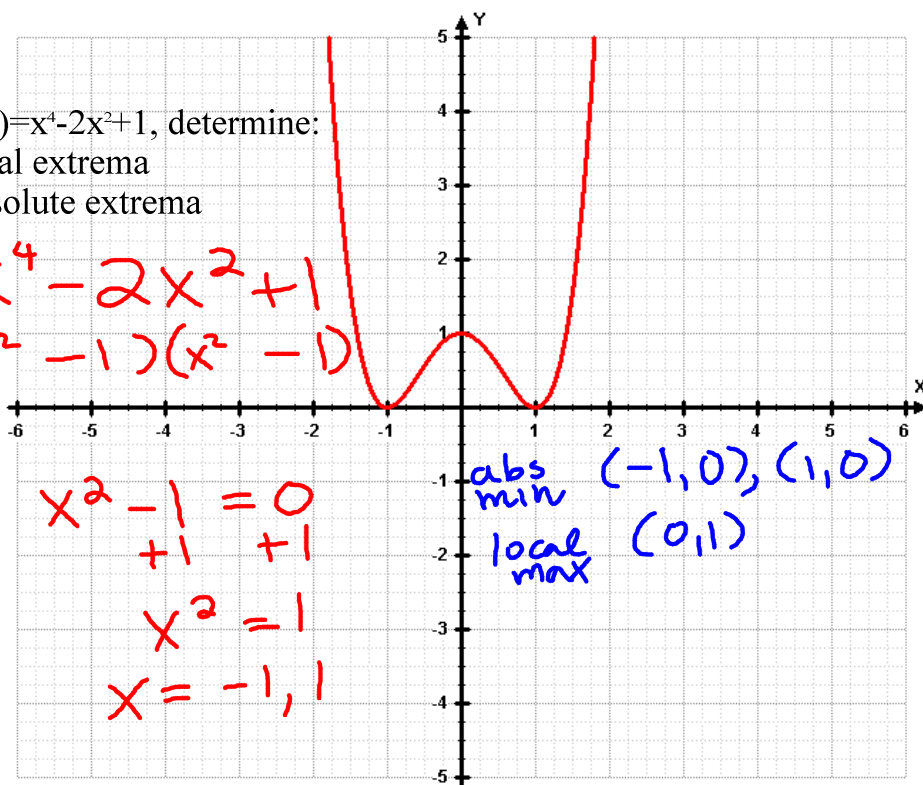
$$(x^2 - 1)(x^2 - 1)$$

$$x^2 - 1 = 0$$

$$+1 \quad +1$$

$$x^2 = 1$$

$$x = -1, 1$$



4) Solve $\frac{x^2 + 3x + 2}{x^2 - 16} \geq 0$ using any method.

$$\frac{(x+1)(x+2)}{(x+4)(x-4)}$$

$$-1 \quad -2$$

$$-4 \quad 4$$

$$(-\infty, -4] \cup [-2, -1] \cup [4, \infty)$$

$$x \leq -4, -2 \leq x \leq -1, x \geq 4$$

int.	test	
$-\infty, -4$	-8	+
$-4, -2$	-3	-
$-2, -1$	-1.5	+
$-1, 4$	0	-
$4, \infty$	5	+

5) Consider the rational function $y = \frac{2x-10}{x^2-x-2}$.

a. State the equations of any vertical asymptotes, if there are any.

b. Identify the equations of any horizontal asymptotes, if there are any.

a) $x^2 - x - 2 = 0$
 $(x-2)(x+1) = 0$
 $x = 2, -1$

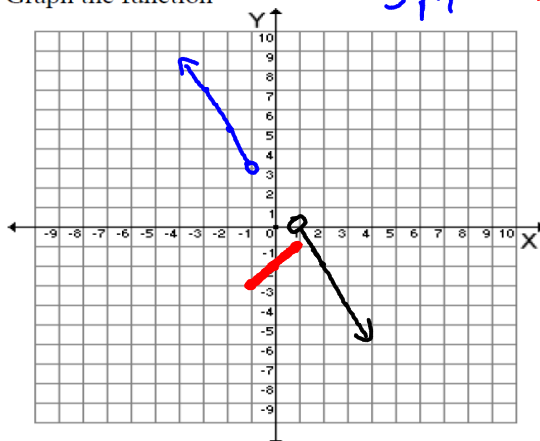
b) $\frac{2x-10}{x^2-x-2}$ no horizontal asymptote

Use the function shown below to complete the following.

$$f(x) = \begin{cases} |2x-1| & \text{if } x < -1 \\ x-2 & \text{if } -1 \leq x \leq 1 \\ -2|x-1| & \text{if } x > 1 \end{cases}$$

6)

a. Graph the function



b. Evaluate f at $x = -2, 0, 2$, and 4

5, -2, -2, -6

c. Determine the x values where $f(x) = 0$ none

7) Use $f(x)=x^2-25$ and $g(x)=x^2-10x+16$ to find and simplify the following.

a. $(fg)(x)$

$$(x^2-25)(x^2-10x+16)$$

b. $(f/g)(x)$

$$\frac{x^2-25}{x^2-10x+16} = (x-8)(x-2) \quad x \neq 8 \text{ or } 2$$

c. $(f \circ g)(x)$

$$(x^2-10x+16)^2-25$$

braically whether $f(x) = 3x - 2$ and $g(x) = (x+2)/3$ are inverses of each other.

$$\cancel{3}(x+\cancel{2/3}) - 2$$

$$= x + 2 - 2$$

$$= x$$

9) Solve the following:

a. $4(1.3)^x - 10 = 70$

$$\begin{aligned} &+10 \quad +10 \\ &\frac{4(1.3)^x}{4} = \frac{80}{4} \\ &1.3^x = 20 \end{aligned}$$

$$\begin{aligned} \log_{1.3} 1.3^x &= \log_{1.3} 20 \\ x &\approx 11.42 \\ (\log 20) / (\log 1.3) \end{aligned}$$

b. $2 \log 3x + 5 = 1$

$$\begin{aligned} &-5 \quad -5 \\ &\frac{2}{2} \log 3x = -\frac{4}{2} \\ &\log 3x = -2 \end{aligned}$$

$$\begin{aligned} 10^{\log 3x} &= 10^{-2} \\ \frac{3x}{3} &= \frac{.01}{3} \\ x &= .00333... \end{aligned}$$

10) Find the vertex of $f(x) = -2x^2 + 2x + 3$.

$$x = -\frac{2}{2(-2)} = \frac{-2}{-4} = \frac{1}{2}$$

$$\begin{aligned} y &= -2\left(\frac{1}{2}\right)^2 + 2\left(\frac{1}{2}\right) + 3 \\ &= -2\left(\frac{1}{4}\right) + 2\left(\frac{1}{2}\right) + 3 \\ &= -.5 + 1 + 3 \\ &= 3.5 \end{aligned}$$

$$\boxed{(.5, 3.5)}$$